

What is claimed is:

1. An orifice assembly for use with a high pressure fluid jet cutting nozzle comprising:

an orifice body having an upstream portion at a first end and a downstream

5 portion at a second end;

a central bore extending from the first end to the second end;

a mixing cavity defined by the downstream portion; and

a high pressure cavity defined by the upstream portion having a generally cylindrical side wall and a bottom wall generally normal to the axis of the central bore wherein a transition portion between the side wall and the bottom wall has a generally quarter circle curvilinear sectional profile to provide a constant radius transition between the side wall and the bottom wall.

2. The orifice assembly of claim 1 further comprising an abrasive material inlet bore leading to the mixing cavity.

3. The orifice assembly of claim 2 wherein the high pressure cavity has a generally cylindrical side wall and a generally rectilinear bottom wall.

4. The orifice assembly of claim 2 wherein the mixing cavity has a frustoconical upstream wall and a cylindrical downstream wall.

5. The orifice assembly of claim 2 wherein the high pressure cavity bottom wall has a recess formed therein to receive a body having an orifice coaxial with the bore.

6. The orifice assembly of claim 2 wherein a seal recess is formed in the first end of the orifice body.

7. The orifice assembly of claim 6 wherein the seal recess is annular and coaxial with the bore.

8. The orifice assembly of claim 7 further comprising a resilient seal disposed in the seal recess.

5 9. The orifice assembly of claim 2 wherein the second end defines a frustoconical recess coaxial with the bore to receive and align a mixing tube.

10. The orifice assembly of claim 1 further comprising a mixing tube mated to the down stream portion of the orifice body wherein the mixing tube has an axis that is coaxial with the axis of the central bore, and a jewel disposed at the bottom wall for forming a precise column of pressurized fluid.

11. An orifice assembly for use with a high pressure fluid jet cutting nozzle comprising:

an orifice body having an upstream portion at a first end, a downstream portion at a second end, and an axis;

15 a first bore extending from the first end to the second end, generally parallel to the axis;

a mixing cavity communicating with the first bore and defined by the downstream portion; and

20 a second bore defined by the orifice body for introducing abrasive material into the mixing cavity.

12. The orifice assembly of claim 11 wherein the second bore has an axis and the axis is not parallel with the orifice body axis.

13. The orifice assembly of claim 11 wherein the second bore is in direct communication with the mixing cavity.

14. The orifice assembly of claim 11 wherein the first bore is in communication with a high pressure cavity defined by the upstream portion having a generally cylindrical side wall and a bottom wall generally normal to the axis of the orifice body wherein a transition portion between the side wall and the bottom wall has a generally quarter circle curvilinear sectional profile to provide a constant radius transition between the side wall and the bottom wall.

15. The orifice assembly of claim 11 further comprising a mixing tube positioned adjacent to the mixing chamber wherein the mixing tube has an axis coaxial with the first bore, and a nozzle body concentrically surrounding the orifice assembly and the nozzle body.

16. The orifice assembly of claim 11 further comprising a jewel defining an orifice coaxial with the orifice body axis located upstream of the mixing chamber.

17. The orifice assembly of claim 16 wherein the upstream portion of the orifice body defines a high pressure cavity and the jewel is disposed in a recess at a bottom wall of the high pressure cavity.

18. The orifice assembly of claim 17 further comprising a soft seal adjacent an opening of the high pressure cavity to provide a sealing means between the orifice assembly and an inlet body.

19. The orifice assembly of claim 11 further comprising a soft seal located at the upstream portion of the orifice body to provide a sealing means between the orifice assembly and an inlet body.